




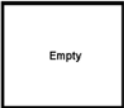
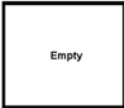







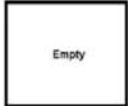


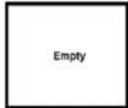
Caltrans Condition Tables

The following tables are part of a set developed for the Caltrans Pilot Culvert Inspection program.





The rating system developed by Caltrans is compatible with the Caltrans Culvert Inventory Database and not related to the FHWA rating system in the Culvert Inspection Manual.

RIGID CULVERT BARREL (Concrete)	
Waterway Adequacy 0-No deficiencies found. 1-GOOD: Minor debris and sediment, less than 25% blockage. 2-FAIR: Significant debris and sediment, between 25% and 50% blockage. 3-POOR: Between 50% and 75% blockage flooding of roadway and/or adjacent properties. 4-CRITICAL: Over 75% blockage.	   
Alignment 0-No Deficiencies Found 1-GOOD: Minor settlement and isolated misalignments. 2-FAIR: Significant settlement and misalignment throughout. 3-POOR: Poor alignment and major settlement causing ponding of water. Dislocated joints allowing backfill to infiltrate culvert barrel. 4-CRITICAL: Integrity of culvert is compromised due to misalignment.	   








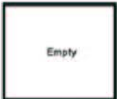
Appendix C- Caltrans Condition Tables – Contd.

RIGID CULVERT BARREL (Concrete)	
<p>Joints</p> <p>0-No deficiencies found.</p> <p>1-GOOD: Tight, no openings. Minor cracking and spalling at joints.</p> 	<p>3-POOR: Dislocated joints allowing backfill to infiltrate culvert barrel.</p>  <p>4-CRITICAL: Significant separation at joints has compromised the integrity of culvert.</p> 
 <p>2-FAIR: Joint separation. Significant cracking and spalling at joints.</p>	
<p>Material</p> <p>0-No deficiencies found.</p> <p>1-GOOD: Minor cracking. Minor scaling of invert.</p>  <p>Empty</p>	<p>3-POOR: Longitudinal cracks larger than 0.1 inches in width. Invert scaling larger than 0.5-inches. Major spalling and slabbing with exposed reinforcing steel. Major corrosion of reinforcing steel.</p>  <p>4-CRITICAL: Complete to minor collapse of barrel.</p> 
<p>2-FAIR: Longitudinal cracks between 0.01 and 0.1 inches in width. Invert spalls up to 0.25 inches. Minor spalling.</p>  <p>Empty</p>	

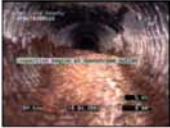




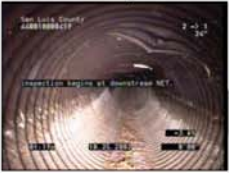



Appendix C- Caltrans Condition Tables – Contd.

Flexible Culvert Barrel (Plastic)	
Waterway Adequacy 0-No Deficiencies Found 1-GOOD: Minor debris and sediment, less than 25% blockage.  2-FAIR: Significant debris and sediment, between 25% and 50% blockage.	3-POOR: Between 50% and 75% blockage, flooding of roadway and/or adjacent properties.  4-CRITICAL: Over 75% blockage.
Shape 0-No deficiencies found 1-GOOD: Minor isolated distortions in top half. Minor flattening of invert and/or crown. Horizontal diameter is 0% to 10% of design.  2-FAIR: Significant distortions throughout crown and/of invert. Some kinks present. Horizontal diameter 10% to 20% of design.	3-POOR: Major distortions and flattening of crown and/or invert through pipe. Horizontal diameter between 20% and 35% of design.  4-CRITICAL: Complete collapse of crown.


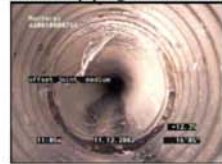
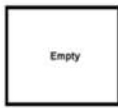




Appendix C- Caltrans Condition Tables – Contd.

Flexible Culvert Barrel (Plastic)	
<p>Seams and Joints</p> <p>0-No deficiencies found.</p> <p>1-GOOD: Tight, no openings. Minor cracking.</p> <p>2-FAIR: Minor separation of joints.</p>	<p>3-POOR: Significant joint separation with piping or infiltration of material.</p> <p>4-CRITICAL: Significant separation at joints/seams has compromised the integrity of culvert.</p>
	
	
<p>Material</p> <p>0-No deficiencies found.</p> <p>1-GOOD: Minor abrasions.</p> <p>2-FAIR: Heavy abrasions. Some perforations present.</p>	<p>3-POOR: Significant perforations and tears, but no evidence of backfill infiltration.</p> <p>4-CRITICAL: Significant perforations and/or tears allowing backfill to infiltrate culvert barrel.</p>
	
	









Appendix C- Caltrans Condition Tables – Contd.

FLEXIBLE CULVERT BARREL (Steel or Aluminum)	
Waterway Adequacy 0-No Deficiencies found. 1-GOOD: Minor debris and sediment, less than 25% blockage. 	3-POOR: Between 50% and 75% blockage. Flooding of roadway and/or adjacent properties. 
 2-FAIR: Significant debris and sediment, between 25% and 50% blockage. 	4-CRITICAL: Over 75% blockage. 
Shape 0-No Deficiencies found. 1-GOOD: Minor isolated distortions on top half. Minor flattening of invert and/or crown. Horizontal diameter is 0 to 10% of design. 	3-POOR: Major distortions within pipe. Major kinks and deflections. Flattening of crown and/or invert. Horizontal diameter between 20 % and 35% of design. 
2-FAIR: Significant distortion at isolated locations on top half. Significant flattening of invert. Some kinks present. Horizontal diameter 10% to 20% of design. 	4-CRITICAL: Complete collapse of crown. 





Appendix C- Caltrans Condition Tables – Contd.

FLEXIBLE CULVERT BARREL (Steel or Aluminum)	
<p>Seams and Joints</p> <p>0-No Deficiencies found.</p> <p>1-GOOD: Tight, no openings. Minor cracking at bolt holes.</p> <p>2-FAIR: Minor separation of joints/seams.</p> 	<p>3-POOR: Significant joint separation with piping or infiltration of backfill material into culvert.</p>  <p>4-CRITICAL: Failed</p> 
<p>Material</p> <p>0-No deficiencies found.</p> <p>1- GOOD : Superficial rust or corrosion. Minor pitting.</p>  <p>2- FAIR: Scattered heavy rusting or corrosion and deep pitting.</p> 	<p>3-POOR: Extreme rusting or corrosion and deep pitting. Perforations present.</p>  <p>4-CRITICAL: Significant perforations. Integrity of invert is compromised.</p> 




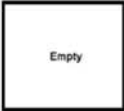




Appendix C- Caltrans Condition Tables – Contd.

HEADWALL (Concrete)	
Waterway Adequacy <p>0-No deficiencies found.</p> <p>1-GOOD: Minor debris and sediment, less than 25% blockage.</p>  <p>2-FAIR: Significant debris and sediment, between 25% and 50% blockage.</p> 	<p>3-POOR: Between 50% and 75% blockage flooding of roadway and/or adjacent properties.</p>  <p>4-CRITICAL: Over 75% blockage, flooding of roadway and/or adjacent properties or water bypasses culvert.</p> 
Shape <p>0-No deficiencies found.</p> <p>1-GOOD: Minor settlement of headwall and/or wingwalls (if present).</p>  <p>2-FAIR: Major settlement of headwall and/or wingwalls (if present). Still mostly vertical plumb.</p> 	<p>3-BAD: Headwall and/or wingwall (if present) out of plumb. Separations of joints between headwall and wingwall.</p>  <p>4-CRITICAL: Headwall and/or wingwalls (if present) out of plumb and is endanger of collapse.</p> 








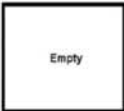
Appendix C- Caltrans Condition Tables – Contd.

HEADWALL (Concrete)	
Material	0-No Deficiencies Found
1-GOOD: Minor spalling and cracking. Minor spalling of invert.	
2-FAIR: Significant spalling with some exposed reinforcing steel.	
3-POOR: Major spalling and/or slabbing. Major corrosion of reinforcing steel.	
4- CRITICAL: Headwall has failed, is endanger of tipping over, and/or separation from culvert barrel.	

Appendix C- Caltrans Condition Tables – Contd.

FLARED END SECTION (Aluminum or Steel)	
<p>Waterway Adequacy</p> <p>0-No deficiencies found.</p> <p>1-GOOD: Minor debris and sediment, less than 25% blockage.</p> <p>2-FAIR: Significant debris and sediment, between 25% and 50% blockage.</p>	<p>3-POOR: Between 50% and 75% blockage, flooding of roadway and/or adjacent properties.</p> <p>4-CRITICAL: Over 75% blockage, flooding of roadway and/or adjacent properties.</p>
 	 
<p>Shape</p> <p>0-No deficiencies found.</p> <p>1-GOOD: Minor dents and kinks.</p> <p>2-FAIR: Major kinks and dents in flared section and/or apron.</p>	<p>3-BAD: Flared section and/or apron is severely dented and/or kinked, but water flow is not restricted.</p> <p>4-CRITICAL: Flared end section has separated from culvert barrel. Flared ends and/or apron are bent such that water flow is restricted.</p>
 	 




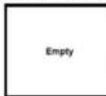
Appendix C- Caltrans Condition Tables – Contd.

FLARED END SECTION (Aluminum or Steel)	
<p>Waterway Adequacy</p> <p>0-No deficiencies found.</p> <p>1-GOOD: Minor debris and sediment, less than 25% blockage.</p> <p>2-FAIR: Significant debris and sediment, between 25% and 50% blockage.</p>	<p>3-POOR: Between 50% and 75% blockage, flooding of roadway and/or adjacent properties.</p> <p>4-CRITICAL: Over 75% blockage, flooding of roadway and/or adjacent properties.</p>
 	 
<p>Shape</p> <p>0-No deficiencies found.</p> <p>1-GOOD: Minor dents and kinks.</p> <p>2-FAIR: Major kinks and dents in flared section and/or apron.</p>	<p>3-BAD: Flared section and/or apron is severely dented and/or kinked, but water flow is not restricted.</p> <p>4-CRITICAL: Flared end section has separated from culvert barrel. Flared ends and/or apron are bent such that water flow is restricted.</p>
 	 

Appendix C- Caltrans Condition Tables – Contd

FLARED END SECTION (Concrete)	
<p>Waterway Adequacy</p> <p>0-No deficiencies found.</p> <p>1-GOOD: Minor debris and sediment, less than 25% blockage.</p> <p>2-FAIR: Significant debris and sediment, between 25% and 50% blockage.</p>	<p>3-POOR: Between 50% and 75% blockage, flooding of roadway and/or adjacent properties.</p> <p>4-CRITICAL: Over 75% blockage, flooding of roadway and/or adjacent properties.</p>
<p>Material</p> <p>0-No deficiencies found.</p> <p>1-GOOD: Minor spalling and cracking.</p> <p>2-FAIR: Significant spalling with some exposed reinforcing steel.</p>	<p>3-POOR: Major spalling and/or slabbing. Major corrosion of reinforcing steel.</p> <p>4-CRITICAL: Integrity of FES is compromised.</p>







Appendix C- Caltrans Condition Tables – Contd.

DRAINAGE INLET (Aluminum, Steel, or Concrete)				
Waterway Adequacy		3-POOR: More than 50% blockage, flooding of roadway and/or adjacent properties.		
0-No deficiencies found.	Empty			
1-GOOD: Minor debris and sediment, less than 25% blockage.	Empty			
2-FAIR: Significant debris and sediment, between 25% and 50% blockage.	Empty			
Material		3-POOR: Grate deformed. Significant perforations in steel. Ladder missing. Significant portions of concrete missing. Reinforcing steel exposed and corroding. Concrete chipped or spalled.		
0-No deficiencies found.	Empty			
1-GOOD: Superficial rust or corrosion of metal. Minor pitting or minor cracking of concrete.	Empty			
2-FAIR: Scattered heavy rusting or corrosion of metal. Deep pitting or spalling of concrete. Some reinforcing steel exposed.	Empty			
		4-CRITICAL: Grate unusable or missing. Integrity of DI is compromised.		

Appendix C- Caltrans Condition Tables – Contd.

SCOUR	
Scour	
0-No Deficiencies Found	
1-GOOD: Minor bed scour present	Empty
2-FAIR: Significant undermining of end treatment, culvert barrel, or footing due to scour.	Empty
3-POOR: End treatment, culvert barrel, or footing has been cracked displaced or settled due to bank erosion or scour.	Empty
4-CRITICAL: End treatment, culvert barrel, or footing weakened and endanger of immediate collapse due to scour.	Empty

Appendix C- Caltrans Condition Tables – Contd.

EMBANKMENT			
Embankment	0-No deficiencies found. 1-GOOD: Minor erosion of embankment.		3-POOR: Major erosion of slope, guardrail displaced/settled, posts loosened/separated from soil. End treatment or wingwalls are tipping.
	2-FAIR: Significant slope gully. Backfill behind end treatment or wingwalls displaced.		4-CRITICAL: Guardrail, wingwalls, headwalls, or roadway weakened and endanger of immediate failure.
			
Piping	0-No Deficiencies Found 1-GOOD: No piping present.		3-POOR: Piping has caused significant erosion of embankment.
	2-FAIR: Some evidence of piping.		4-CRITICAL: Piping has caused weakening of structure, embankment, or roadway.
			








Appendix C- Caltrans Condition Tables – Contd.

ROADWAY		
0-No Deficiencies Found	Empty	
1-GOOD: Pavement cracks over culvert.	Empty	
2-FAIR: Minor settlement or misalignment of pavement or PCC slabs.	Empty	
3-POOR: Dips/sags in pavement or guardrail over culvert. Longitudinal separation, differential displacement of PCC slabs. Pavement patches or evidence that the roadway has been built-up.	Empty	
4-CRITICAL: Settlement of roadway has caused deterioration of ride quality.	Empty	

Appendix C- Caltrans Condition Tables – Contd.

Streambed	
0-No deficiencies found.	
1-GOOD: Minor debris, scour, or erosion.	Empty
3-FAIR: Significant debris, minor undermining of end treatment or minor gully in embankment.	Empty
3-POOR: Channel alignment causing scour holes, bank erosion, and is threatening end treatment. Debris in streambed is causing flooding or diversions. Major erosion of slopes.	Empty
4-CRITICAL: End treatment is significantly impacted by poor alignment of channel, bank erosion, scouring, or piping.	Empty

Appendix C- Caltrans Condition Tables – Contd.

RISER PIPE (Aluminum or Steel)	
Waterway Adequacy	<p>0-No deficiencies found.</p> <p>1-GOOD: Minor debris and sediment, less than 25% blockage.</p>  <p>2-FAIR: Significant debris and sediment, between 25% and 50% blockage.</p>  <p>3-POOR: Between 50% and 75% blockage, flooding of roadway and/or adjacent properties.</p>  <p>4-CRITICAL: Over 75% blockage, flooding of roadway and/or adjacent properties.</p> 
Shape	<p>0-No deficiencies found.</p> <p>1-GOOD: Minor dents and kinks. Superficial rust or corrosion. Minor pitting.</p>  <p>2-FAIR: Major kinks and dents. Scattered heavy rusting or corrosion and deep pitting.</p>  <p>3-BAD: Riser Pipe is severely dented and/or kinks. Extreme rusting or corrosion and deep pitting. Perforations present.</p>  <p>4-CRITICAL: Damage to riser pipe has compromised its integrity.</p> 